guished colleague and former pupil of his, to whom we are indebted for some of the facts recorded above, writes: "Je suis navré de la mort de mon vénéré Maître. . . . Il avait conquis les sympathies de tous par son caractère enjoué et si aimable, par son accueil charmant pour tous, les grands comme les petits, les puissants comme les faibles, par son exquise bienveillance. . . . Il restera de lui le souvenir d'un savant érudit d'une haute courtoisie."

A. T. SIMMONS.

MANY science teachers and students will learn with much regret that Mr. A. T. Simmons, inspector of secondary schools for the University of London, and author of a number of widely used text-books of science, died from pneumonia on August 19, at fifty-six years of age. Mr. Simmons received his chief scientific training at the Royal College of Science, London, in 1882–87, and during these years he and his fellow-student, Mr. H. G. Wells, were almost inseparable. After becoming an associate (physics) of the college, he was for three years lecturer in physics, chemistry, and other science subjects at the Southport Science and Art Institute, and while occupying this post he proceeded to work for the B.Sc. degree of the University of London, graduating with first-class honours in physical geography and geology in 1890. During the years 1891–97 he was science and second master at Tettenhall College, near Wolverhampton, where numerous students learned to esteem his high character and teaching aptitude. He came to London in order to undertake general editorial and advisory work for Messrs. Macmillan and Co., Ltd., in connection with school manuals on scientific subjects, and was a part-time member of the staff until his death. In association with Sir Richard Gregory, he founded in 1899 the *School World*, published by Messrs. Macmillan, and continued as joint-editor when that magazine was incorporated with the *Journal of Education* in 1918.

By his many years of devoted service on these periodicals, the sympathetic and helpful spirit in which he carried out his duties as inspector of science work in schools, and the assistance he afforded to many authors of text-books, Mr. Simmons won the highest regard from a large circle of the educational world. His influence upon the teaching of scientific subjects was strong and far-reaching, and his death will be mourned not only by his personal friends, but also by numerous teachers and students familiar with his books both at home and overseas. His personality and his works will long be cherished in most affectionate memory.

NEWS has reached us that one of the best Russian zoologists, PROF. N. A. CHOLODKOVSKY, academician and professor emeritus in the Academy of Medicine and at the Institute of Forestry, died last April in Petrograd at sixty-one years of age. Prof. Cholodkovsky was the author of numerous works on entomology and helminthology. One of his best works is a "Monograph on Chermes Injurious to Coniferous Trees," 1906. His excellent text-books on zoology are adopted in most Russian universities. To the general public Prof. Cholodkovsky was also known as a poet of high merit. To his pen belong the best translations into Russian of Shakespeare, Byron, Goethe, and others. For his masterly translation of Goethe's "Faust," with commentaries and a new criticism, he was awarded the Grand Premium in Literature by the Russian Imperial Academy of Sciences.

THE death is announced, in *Science* of August 12, of CHARLES BARNEY CORY, curator of zoology in the Field Museum of Natural History, which occurred on July 29, at the age of sixty-four years. Mr. Cory was one of the founders and a past president of the American Ornithologists' Union and a member of many learned societies, and was widely known for his ornithological writings.

Notes.

THE announcement appears in *Science* of August 12 that Prof. R. A. Millikan, of the University of Chicago, has been appointed director of the new Norman Bridge Laboratory of Physics at the California Institute of Technology, and chairman of the executive council of the institute. An income of 95,000 dollars for the new laboratory alone has been promised by the institute, and additional funds available comprise sums of 200,000 dollars and 50,000 dollars, which have been promised by Dr. Norman Bridge for the extension of the laboratory and its library respectively. With this generous provision it is hoped to create a large and effective laboratory for research in physics. In conjunction with the laboratory, the Southern California Edison Company is to erect an experimental station in the grounds of the institute for the investigation of the transmission of electric power at high potentials; Prof. Millikan will be partially responsible for the direction of this station. The main problem, however, which Prof. Millikan proposes to attack is the constitution of matter and its relation to the phenomena of radiation, a task for which the new laboratory will provide exceptional opportunities. It is also announced that Prof. H. A. Lorentz, of the University of Leyden, will be in residence at the institute during the winter term as lecturer and research associate in order to supplement the work of the mathematical physics department, and that Dr. C. G. Darwin, of Cambridge, has been appointed professor of this department for the academic year 1922–23.

THE council of the British Association for the Advancement of Radiology and Physiotherapy has recently issued a statement warning the public against undue optimism about the use of radiotherapy in the treatment of cancer. The new technique, which has been developed at Erlangen, Bavaria, has not yet been thoroughly tested, and, in any case, evidence of success cannot be assumed until after the lapse of some years. The council is of the opinion that of any single method surgery still offers the best prospects of cure in most cases of cancer. Combined treatment by operation and radiation therapy has been employed with good results, and so far the co-operation of the radiologist with the surgeon affords the greatest hope of success. The association has organised a scheme for the investigation of the claims made for the new intensive X-ray treatment, for which purpose a sum of 4000*l.* has been allocated by an anonymous donor (*Arch. Radiology and Electrotherapy,* No. 252, July, 1921, p. 38). It is suggested that a research scholar be appointed for two years at a salary of 350*l.*, with travelling allowance, and that he proceed to Erlangen, where the treatment has been in progress for several years. If it is found that the results obtained there approach the claims made, a complete outfit of apparatus such as that used at Erlangen would be ordered and installed at the Manchester Royal Infirmary and the work continued there.

THE President of the French Republic has conferred the Cross of Chevalier of the Legion of Honour on Col. Sir Arthur Mayo-Robson for services rendered by him to the French Red Cross during the war.

IT is announced that the Advisory Committee provided for by the Importation of Plumage (Prohibition) Act will be constituted as follows:—Lord Crewe (chairman), Mr. E. C. Stuart Baker and Dr. W. Eagle Clarke (representing ornithology), Mr. C. F. Downham, Mr. W. G. Dunstall, and Mr. L. Joseph (representing the feather trade), Lord Buxton, Capt. E. G. Fairholme, Mrs. Reginald McKenna, and Mr. H. J. Massingham.

AT a meeting of the Privy Council, held at Buckingham Palace on August 10, the petition of the Institution of Electrical Engineers for a Royal Charter of Incorporation was approved, and a Royal Charter has now been granted. His Majesty the King has also been graciously pleased to intimate his willingness to become patron of the institution.

IT is announced in *Science* of August 5 that the Municipal Observatory at Des Moines, Iowa, said to be the only municipal observatory in the world, was opened on August 1. The observatory building is to be equipped by Drake University with an 8-in. equatorial telescope. It is to be under the control of the university, and open to the public at least three times a week, and at any other time when occasion may warrant.

CAPT. ROALD AMUNDSEN has arrived at Vancouver from Nome, Alaska. The *Times* announces that he intends to sail for the Arctic next spring to resume his attempt to drift across the Arctic Ocean. Two aeroplanes furnished with sleds will be carried by the expedition. Meanwhile the *Maud* is on her way to Seattle for repairs and the installation of more powerful wireless equipment. It will be recalled that the *Maud's* first attempt to drift with the pack was unsuccessful, and that she was forced to winter in the ice off the coast of north-eastern Siberia, where she lost a propeller.

ANNOUNCEMENT was made of the coming Paris meeting of the Iron and Steel Institute, under the presidency of Dr. J. E. Stead, in NATURE of June 2, p. 434. A programme of the meeting, which will be held at the headquarters of the Comité des Forges de France on September 5 and 6, has now been issued. It is expected that ten papers will be submitted, most of them dealing with the constitution and properties of various types of steel, though two will be of economic interest. Advance copies of the papers can be obtained by members of the institute from the Secretary, 28 Victoria Street, S.W.1. At the conclusion of the meeting, alternative visits have been arranged to works in Lorraine, Burgundy, and Normandy.

IT is reported in the *Pioneer Mail* of July 15 that the Bose Research Institute, established some four years ago at Darjeeling, is actively at work and engaged in investigations of wide interest. The Government of India has obtained the consent of the Secretary of State for a permanent Imperial grant which will be double the income derived from public donations, of which Sir J. C. Bose's contributions alone will amount to 10 lakhs of rupees (66,666*l.*). Problems dealing with agriculture will be investigated on an experimental station at Sijberia, while at Darjeeling an attempt is to be made to conserve an entire hill-side with the view of investigating the flora of the district and of preserving wild plants from Sikkim and Tibet which are in danger of extermination.

AT a small business meeting held on August 16 at the Hotel Cecil, the Society for Constructive Birth Control and Racial Progress was formally constituted, with Dr. Marie Stopes as president. The objects of the society are: (*a*) To bring home to all the fundamental nature of the reforms involved in conscious and constructive control of conception, and the illumination of sex life as a basis of racial progress; (*b*) to consider the individual, national, international, racial, political, economic, scientific, spiritual, and other aspects of the theme, for which purpose meetings will be held, publications issued, and research committees, commissions of inquiry, and other activities organised from time to time as circumstances require and facilities offer; (*c*) to offer to all who still need it the full knowledge of the methods of control.

A CONGRESS of Applied Chemistry, to be held in Paris on October 9–12, is being organised by La Société de Chimie Industrielle de France. The congress, which will also be the first annual meeting of the society, will be split up into thirty-four sections, corresponding to various branches of industrial chemistry. All meetings will be held in the Conservatoire des Arts et Métiers, and the inaugural ceremony, which will take place on October 10, will be presided over by M. Dior, the French Minister of Commerce. The society is also organising, at the Conservatoire, a Chemical Exhibition, which will be open on October 9–16. Two sections only will be represented, those dealing with laboratory equipment and colouring matters, but it is hoped that the exhibition, at which most French manufacturers will be represented, will be the germ of a future chemical exhibition embracing all branches of industrial chemistry.

THE latest news from the Mount Everest expedition is contained in Col. Howard Bury's dispatch to the *Times* published on August 17. Leaving their base camp at Tingri, the expedition explored the approach to Mount Everest on the north-west. The chief obstacles were great glacier streams which proved quite unfordable in July, and could be crossed only where frail native bridges existed. The expedition crossed the Kyetrak glacier valley on such a bridge, and marching by Zambu reached the Rongbuk glacier, in the valley of which it camped at a height of 18,000 ft., some miles from the great Rongbuk Monastery, which stands at 16,500 ft. Progress in this direction did not look promising owing to the sheer precipices of 10,000 ft. which descend to the Rongbuk glacier, and even supposing the ridge summits at 26,000 ft. were gained, there still remains difficult rock climbing at greater heights. In the course of their reconnaissance Mr. Mallory and Mr. Bullock climbed a peak of more than 23,000 ft., but their coolies were unable to reach the summit. August was to be devoted to the eastern and north-eastern faces of Mount Everest, which have more snow and ice on them than the north-western side, and the base camp for this purpose was to be moved in the vicinity of Kharta, in the Arun Valley. Col. Howard Bury hopes to find a high pass leading from the Rongbuk glacier into the valley of the Kharta Tsangpo, but finds it impossible to get any accurate information from the Tibetans. The weather broke early in July, and poor visibility now hampers the work.

THE widespread faith in Australia in water-divining has led Dr. Griffith Taylor to examine its working in the Federal Capital Territory, and he has communicated his conclusions and some quotations from the literature of the subject to the Proceedings of the Royal Society of Victoria (vol. xxxiii., N.S., 1921, pp. 79–86). He dismisses water-divining as of no practical value and as of interest to the psychologist rather than to the geologist or farmer. His own evidence, however, like some other scientific tests of the question, is inconclusive. He reports two cases. A well was sunk at Ainslie at a point selected by a diviner, who "estimated that water would occur at about 56 ft." Dr. Taylor reports that "at 56 ft. some water came in; at 64 ft. water was 'bubbling in.'" In this case the well was sunk in an area where drifts lay on a slope of impermeable beds, and water could have been obtained at any site. This success was probably mere coincidence, but the prediction was justified by the result. In the second case another diviner recommended a site on a ridge of shale; naturally, the well was a complete failure. Dr. Taylor quotes records of more extensive inquiries, including the Guildford case of 1913, an early investigation by the Government of South Australia, and one in 1920 by the New South Wales Water Conservation Commission. This Commission's inquiry covered fifty-six bores selected by diviners, and of these 70 per cent. were successful; of ninety-six bores selected without the diviners' aid 87 per cent. were successful. The accumulation of evidence against the divining-rod is useful, and though it may show that the method is of no practical value, many of the tests are not conclusive against those who consider that certain individuals in suitable circumstances are influenced sub-consciously by underground water.

SIR FREDERIC KENYON's presidential address to the Museums Association, in which he set forth his views as to the future development and arrangement of the British Museum (*see* NATURE, July 28, p. 689), is now published in the August issue of the *Museums Journal* (Dulau and Co.).

REFERRING to recent correspondence in NATURE, Mr. A. S. E. Ackermann writes to say that in August of last year at Ypres he saw bumble-bees abstracting nectar from the flowers of white-runner beans through a hole in the side of the corolla instead of in the normal manner.

THE camera is being used increasingly to elucidate the habits of birds, and striking success has been achieved by Dr. Overton in his observations on the great horned owl, described in *Natural History* (vol. xxi., No. 2). It has hitherto been supposed that the bird attacks its enemies and prey by means of its wings or bill. The remarkable series of photographs which are used to illustrate Dr. Overton's article clearly demonstrates, however, that the bird attacks solely with its feet. We have seldom seen so conclusive a collection of photographs of birds.

IN the June issue of the *Lancashire and Cheshire Naturalist* Mr. R. Standen records some interesting observations of his own and other naturalists on the feeding habits of squirrels, with particular reference to fungi. He has watched squirrels feeding on that most poisonous of fungi (to man), the Fly Agaric (*Amanita muscaria*). They were observed to knock off the cap and to eat only the stalk, but so far as is known they were none the worse, and appear to be immune to this particular form of poison. The late Rev. O. Pickard-Cambridge has recorded squirrels as eating *Boletus edulis*, and Mr. Britten has watched them feeding on the Blusher (*Amanita rubescens*), but both these species are non-poisonous. In America squirrels are known to store fungi with their other food, but British squirrels have not as yet been observed to follow this habit. Mr. Standen's notes raise many interesting points, such as the distribution of the poisonous substance in the tissues of the fungus, and the degree of immunity enjoyed by the squirrels. It is clear that there is much to be learnt about the natural history of our British mammals.

THE diminutive shrunken heads made by the Jivaro Indians have long been familiar objects in our museums. In *Natural History* (vol. xxi., No. 2) Mr. C. W. Mead gives an account of how and why they were made. The head, with a small part of the neck, is severed from the body. A cut is made from the base of the skull down through the neck, and through the opening thus made the bones of the skull are carefully removed. The skin and the remaining soft parts are next dipped in the juice of the *huito* fruit, which stains them black. The skin is then ready for the shrinking process. This is done by putting a number of hot stones into the cavity and constantly turning the head in order to bring all parts in contact with the stones. This process is repeated until the head is reduced to the required size. Among some of the tribes a single hot stone nearly as big as the head is used, and replaced by smaller ones until the work is completed. Hot sand is also used in some localities. The lips are then fastened by long pendent cords, and one is run through the top of the head to suspend it. Finally, the cut in the back of the neck is sewn up, and the trophy is completed. Originally a tribal custom of celebrating a victory over an enemy, the Jivaro Indian was not slow to turn it to commercial use when he found that the heads were in great demand among white men. We are told that advance orders were booked and in due course filled.

DR. MARIANNE PLEHN directs attention in an article in the *Allgemeine Fischerei-Zeitung* for August, a translation of which has been sent to us by the Editor of the *Fishing Gazette,* to what she regards as a hitherto unrecognised cause of disease in fish kept in tanks and ponds: this is an excessive quantity of oxygen in solution in the water. It is well known that an abundant growth of algæ in fish cultural ponds may be very injurious. So much oxygen is given off by the plants that the water may effervesce when it is stirred violently. In such circumstances more of the gas is taken up by the blood of fishes than can be used in the ordinary way by the tissues, and then a further rise in the water temperature may cause the liberation of gaseous oxygen in the blood. Vesicles, visible to the naked eye, are said to form in the skin, particularly on the fins. Similar gas vesicles may form in the orbits, giving rise to "exophthalmos." Gas embolisms may even form in the heart and vessels of the gills, causing immediate death. Not only oxygen, but also nitrogen, may, at times, be contained in solution in freshwaters to such an extent as to be the occasion of this "Gaskrankheit," and the author also suggests that gas-forming bacteria in the blood of fishes may be the cause of similar effects. The matter is one of much importance in salmon and trout hatcheries, and, quite evidently, it should be the subject of very careful investigation.

A TELEGRAM from Asmara (Eritrea) reports a rather severe earthquake in that region on or shortly before August 15. The shock was especially strong at Massowah and in the surrounding country, at least four people being killed and about twenty injured, while several houses collapsed. As a rule the earthquakes of Eritrea are infrequent and of slight intensity. Prof. Palazzo, in his catalogue of Ethiopian earthquakes from 1400 to 1912 (Boll. Soc. Sism. Ital., vol. xix., 1915, pp. 293–350), records 142 shocks, the strongest of which occurred in 1400, 1884, and 1901. Asmara itself seems to be one of the least stable regions. Early in 1913 (from January 24 to April 8), 208 disturbances were registered at the seismological station in that place, the strongest of which was of about the same intensity as the recent earthquake.

IT is satisfactory to learn that the valuable work of the Kilauea Volcano Observatory is to be maintained, if not extended. Under the supervision of Dr. T. A. Jagger, jun., and supported by the Hawaian Volcano Research Association, all changes in the activity of the volcano have been chronicled for some years, and the earthquakes, local and otherwise, have been registered. In 1918 a grant of ten thousand dollars was made by Congress, and at the same time the question of placing the observatory under Government direction was considered by a committee of the National Academy of Sciences. On its advice the control of the Kilauea Observatory has been transferred to the Weather Bureau. The full report of the committee has now been published (Proc. Nat. Acad. of Sciences, vol. vi., 1920, pp. 706–16). A general scheme of investigation in either seismology or volcanology is, it considers, beyond the proper scope of the Weather Bureau. For the present, the committee suggests that seismographs might be added at certain selected meteorological stations, and that such work should, if possible, be placed under the direction of a trained seismologist belonging to the Bureau. While the maintenance of the Kilauea Observatory is regarded as of the first importance, the committee recommends that observations should be made on all the active phases of Hawaian volcanism, and that, especially, the gigantic volcano of Mauna Loa, which represents a different stage in the development of a basaltic volcano, should be subjected to an investigation as systematic as may be possible, taking into account its much greater size and the difficulty of access.

THE hydrous calcium borate inyoite, described by W. T. Schaller from California in 1916, has now been found at a second locality, the Whitehead gypsum quarry, Hillsborough, Albert County, New Brunswick. E. Poitevin and H. U. Ellsworth describe a number of crystals, confirming the monoclinic character of the mineral (Canada Depart. of Mines, Geol. Surv., Bull. 32, 1921). It is "fairly soluble" in water, and separated out somewhat later than the massive gypsum, in the cracks of which it lies.

THE Geological Survey of Ireland has issued through the Ordnance Survey two new sheets of the geological map of the country on the scale of a quarter of an inch to a mile (1 : 253,440). Sheet 5 covers a region of unusual interest, and should be specially useful to dwellers in Belfast. Educationally, it serves as an epitome of the geology of Ireland. It includes the gneissic axis of Tyrone, the Caledonian area of Armagh and Down, with the Newry granite in its strike, the down-faulted Carboniferous series of Coal Island, and the Cainozoic granite of the Mournes. The Mesozoic beds, protected by the great plateaus of basaltic lavas, are well seen encircling Lough Neagh. Sheet 16 offers less variety, and shows the rapid succession of Armorican anticlines and synclines in the Devonian and Carboniferous systems round Cork city.

IN a short paper to the International Congress of Mathematicians, Strasburg, 1920, entitled "Une application des polynômes d'Hermite à un problème de statistique," Prof. Alfred Guldberg, of Christiania, reaches the series recommended for the representation of frequency curves and surfaces by Edgeworth in this country, and by Charlier, Thiele, Bruns, and others on the Continent. The large amount of mathematical work on such subjects that is being done in Scandinavia is noteworthy, but the application of the results of the mathematical work on a large scale to a great variety of statistics seems to be required if we are to estimate the usefulness of the work in practice.

THE report of the Royal Observatory, Hong-Kong, for the year 1920 by Mr. Claxton, the director, shows that the usual meteorological and magnetic results have been continued. Automatic records of the temperature of the air and evaporation were obtained with a Richard dry- and wet-bulb thermograph, and the direction and velocity of the wind with a Beckley and a Dines-Baxendell anemograph. The amount of rain is recorded automatically by a pluviograph, and the amount of sunshine is registered by a Campbell-Stokes recorder. Other observations are recorded by eye. The mean barometric pressure and mean temperature for the year were in fair agreement with the normals. The total rainfall for the year was 107·88 in., which is about 24 in. above the normal. The fall in an hour measured 1·44 in. on September 12, and 12·70 in. fell in forty-nine hours on July 18–21. Tracks of sixteen typhoons and four of the principal depressions which occurred in the Far East in 1920 are given in the Monthly Meteorological Bulletin for December. Observations from the Philippines are now received in time for insertion in the daily weather map. Wireless weather telegrams were received from 140 ships in the course of the year, and meteorological registers from 170 ships operating in the Far East. Upper-air research is being considered, as is also the installation of a seismograph.

THE *Meteorological Magazine* for July has an article on the design of rain-gauges, which affects largely the accuracy of rainfall measurements, now being considered with greater assiduity than in the past. The 5000 observers for "British Rainfall" show the necessity for uniformity and precision in the style of gauge. Universal adoption of the now recognised standard patterns of rain-gauge is advocated, and the rejection of certain obsolete patterns. The forms approved are the Snowdon gauge and patterns based on it, such as the Bradford gauge, the Meteorological Office pattern gauge, and the Seathwaite gauge. Some of the essential features given of an approved gauge are: The stout brass turned ring terminating upwards in a knife-edge, exactly 5 or 8 in. in diameter, which forms the rim of the gauge; the vertical cylinder, 4 to 6 in. deep, extending from the rim to the upper edge of the funnel, which is intended to retain snow and hail, to prevent the outsplashing of rain which has fallen upon the funnel, and to reduce to a minimum the risk of loss due to wind eddies; an inner collecting vessel, which can be removed for measuring the fall without disturbing the body of the gauge, the latter being slightly sunk in the ground; and a capacity of not less than 10 in. of rain for a daily gauge. Hints relative to self-recording gauges are also given. Makers of rain-gauges are asked to assist in the elimination of undesirable types of rain-gauge.

SINCE its introduction in 1829 the Trevelyan rocker has formed the subject of many scientific papers, but they have all led to the conclusion that Faraday's explanation of the motion of the rocker was substantially correct. According to Faraday the motion is due to the expansion of the material of the support under one of the two ridges on the under-surface of the rocker by heat communicated to the material from the rocker. This expansion throws the rocker on to its other ridge, allowing the first portion of heated material to cool until it is again the support for the rocker. This theory was put into dynamical form by Davis in 1873, and has been accepted as satisfactory. A recent study of the actual motions of a rocker carried out by Prof. Chuckerbutti, of Calcutta University, and given in vol. vi. of the Proceedings of the Indian Association for the Cultivation of Science, shows, however, that the theory is quite unsatisfactory. The tones produced are those of the elastic vibrations of the system composed of the rocker and its handle, and the pitch of each is determined by these vibrations under the constraints imposed on the rocker by the method of support.

THE third paper on the physical properties of clay, read by Mr. A. S. E. Ackermann before the Society of Engineers, contains a record of forty-nine more experiments, which carry our knowledge of this subject considerably further. By boiling the clay and allowing it to settle, some of the colloidal matter was got rid of, and as a result the pressure of fluidity was decreased by about 25 per cent. When a disc is pressed into a mass of clay, the mean radial speed of flow of the clay underneath the disc is about one-eighth the speed of penetration of the disc, and the mean speed of penetration of the disc when the load on it is just sufficient to produce the pressure of fluidity is about 1 cm. per minute. Some interesting experiments were made with the view of ascertaining the behaviour of the clay immediately below the disc; there appears to be a stagnant cap of clay which remains in contact with the lower side of the disc and travels with it. Even under considerable tangential stress there is no progressive strain in clay containing 25 per cent. of water, which thus behaves as a solid. The addition of an artificial head to the top surface of the same clay increases the pressure of fluidity by about 7 per cent. when the addition is 200 per cent. of the actual head. The experiments on discharging clay under pressure through sharp-edged circular orifices are also of interest. The rate of discharge increases more rapidly than the rate of increase of pressure, and ultimately there is a phenomenon analogous to the pressure of fluidity. Reducing the size of the orifice, keeping the pressure constant, reduces the discharge per unit area of orifice. The initial pressure necessary to cause the discharge to begin increases considerably as the diameter of the orifice is decreased. Practically the same result is obtained whether a disc or a sphere is used in determining the pressure of fluidity, and the result is independent of the diameter of the disc or sphere within a considerable range. Mr. Ackermann's work on this subject shows promise of great value to engineers in dealing with foundations and retaining walls, and we trust that his experimental work will be continued.

Our Astronomical Column.

The Recent Meteoric Display.—Mr. W. F. Denning writes that further proof of the unusually abundant display of August meteors is provided by Mr. S. B. Mattey, observing at St. Helier, Jersey, on August 11 during the quarter of an hour between 14h. and 14h. 15m. G.M.T., who saw sixty-two meteors. This indicates a rate of about 250 per hour, and proves that the shower was witnessed in extraordinary activity. About 25 per cent. of the meteors seen by Mr. Mattey were bright ones, exceeding stars of the first magnitude. Their light was frequently strong enough to illumine buildings near his place of observation; in fact, he describes the effect as being somewhat similar to that occasioned by so-called sheet lightning.

Detection of Encke's Comet.—A letter from Mr. J. F. Skjellerup, dated Capetown, July 29, announces that he and Mr. W. Reid detected Encke's comet on July 27 at 5h. 15m. G.M.T., when it preceded 19 Sextantis by 31 seconds, and was 2′ to the south of it, which makes its apparent position R.A. 10h. 8m. 11s., N. decl. 4° 58′. The estimates of its magnitude by the two observers were 9·5 and brighter than 8·0.

The following elements were predicted by Mr. Matkiewitch:—

$T = 1921$ July $13{\cdot}28$ G.M.T.
$\omega = 184^\circ\ 43{\cdot}5'$
$\Omega = 334^\circ\ 35{\cdot}5'$
$i = 12^\circ\ 31{\cdot}1'$
$\log a = 0{\cdot}34598$
$e = 0{\cdot}84671$
$\log q = 9{\cdot}53149$

The above observation would indicate a value of T some 0·2 day earlier than the prediction.

The comet will be 1921 *d*.

The letter states that Pons-Winnecke's comet was observed at midnight on July 27, in R.A. 1h. 24m., S. decl. 38°, magnitude about 8·5.

Study of the Moon's Surface.—Mr. Walter Goodacre has just brought out the eighth report of the Lunar Section of the British Astronomical Association. He dwells on the immense value in selenography of the splendid photographs taken by Mr. F. G. Pease with the 100-in. Mount Wilson reflector. He states that they show more detail than a 6-in. visual telescope would do, even with the best seeing. The report contains several charts showing on a larger scale much of the detail that has been detected on the photographs. One is of the "Straight Wall near Thebit," showing that it is really by no means straight. Enlargements of the craters Ptolemaus, Clavius, Copernicus, Arzachel, Gassendi, etc., show much new detail, mostly of the nature of tiny craters or narrow clefts. Mr. Goodacre considers that the new evidence is unfavourable to the theory of meteoric formation of the lunar features. Various fine details are noted, in particular an apparent landslip on the wall of Birt A.

Mr. J. W. Durrad contributes a fine drawing of Gassendi, showing numerous clefts on the floor, some of which are new.

The Distances of the Globular Clusters.—The Bulletin of the National Research Council, Washington, D.C., for May last contains an interesting discussion between Dr. Harlow Shapley and Prof. H. D. Curtis on this subject. Taking the Hercules cluster as an example, they contend respectively for 36,000 and 3600 light-years as its distance. The strongest argument for the former distance is the presence of B stars in the cluster and the demonstration that the average absolute magnitude of such stars is zero or brighter, judging from the stars in proximity to the sun. Prof. Curtis prefers to work from the average absolute magnitude of all stars within measurable distance, but Dr. Shapley replies that the average is itself a function of distance, since the stars that are really very faint are altogether lost to view at moderate distances.

Another point discussed is the correlation between period and absolute magnitude in the Cepheid variables. Prof. Curtis gives a diagram showing that the case for this correlation becomes much less convincing than Dr. Shapley had supposed, when the number of galactic Cepheids employed is increased. Dr. Shapley replies that he used the Cepheid method solely as corroborative of several others, and that the strongest argument for the correlation is in reality deduced from the fact that the methods all fall into line so well.

The discussion also involves the status of the spiral nebulæ. Dr. Shapley's estimate of the size of our Galaxy is so great that if the spirals were similar objects they would be so remote that we could not expect to see novæ in them. From the fact that several novæ have been detected he concludes that they are not stellar, but actually formed of diffused matter. Prof. Curtis's smaller galactic diameter permits the view that the spirals are external galaxies. He estimates the distance of the Andromeda nebula (supposed to be the nearest spiral) as 500,000 light-years, and invokes the presence of a zone of occulting matter near the galactic plane to explain the observed distribution of the spirals.

The discussion is highly instructive, and the method of putting the two views of such difficult questions side by side is most helpful as a check on over-hasty deductions and a test of the weaker links in a chain of evidence.